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CHARACTERISTICS AND ANALYSIS OF SHALLOTS FARMING IN DOLOK SILAU SIMALUNGUN, NORTH SUMATRA

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ABSTRACT

The purpose of this study is to determine the characteristics of shallot cultivation and to understand the financial feasibility analysis in Dolok Silau Simalungun to enhance the improvement of the technology needed. Methods used in this research are survey and observation methods. Based on the assessment results, it was found that shallot farming which is planted on dry land and small scale in Sarang Padang, Dolok Silau, Simalungun has a 0,05 – 0,1 ha area. The productivity of that farming is low which averaging 5,25 tonnes/ha. The total production cost is Rp 59.598.000 with a B/C ratio of 0,59. The capital of shallot production is Rp 10.743,00 per kg. Most of the shallot production cost is absorbed by labor cost (36 %), followed by seed cost (35%). The increment of revenue can be achieved by improving productivity through the improvement of farming technologies. Technology improvements in shallot cultivation that are needed are increasing plant density, seed quality improvement, replacement of labor weeding, and the use of integrated pest and disease control. To anticipate price fluctuations, farmers need a storage technology that is a group warehouse to keep the shallot when the market price is very cheap. Institutional education needs to be strengthened for the socialization of shallot cultivation technology and innovation for the farmers.

Keywords: Dolok silau, characteristics, north Sumatra, shallot

INTRODUCTION

The province of North Sumatra every year still lacks shallots. In 2015 this province needed 358,400 tons of shallots, while only 9,849.32 tons were available (BPS 2016). This means that North Sumatra Province lacks a supply of 25,991 tons. This shortcoming is overcome by bringing in shallots from the island of Java and even imports from abroad. Efforts that can be made to overcome the import of shallots are by increasing domestic production. The productivity of shallots in North Sumatra in the last five years has been between 6.9 - 8 t/ha (BPS 2016) and this production is still below its potential yield of 9.8 - 20 tons/ha (Sartono and Suwandi 1996; Winarto *et al.* al.2009; Haryati & Nurawan, 2009).

Dolok Silau District, Simalungun Regency is one of the locations for shallot production centers in North Sumatra. Shallots are planted once a year because the availability of water is limited in that location and only depends on rainwater. The productivity of shallots in this area is relatively low, ranging from 4-5 t/ha.

Onion farming in addition to requiring large capital also has a risk of crop failure. These risks include pest and disease problems (Shahabuddin & Mahfudz, 2010; Yani and Agus 2009; Edi *et al.* 2007; Adiyoga *et al.* 2001), climate change, and hot rain (Titik 2012), and highly elastic price fluctuations (Point 2012). Ali *et al.* 2015; Rosyadi *et al.* 2010). With relatively greater risk, if productivity is low, farmers will lose money and are not interested in growing onions. On the other hand, if the productivity is high and the selling price is high, the profits from farming shallots become very promising (Nana *et al.* 2003; Winarto *et al.* 2009; Dewi 2009).

In an effort to meet the needs, the role of technology is very important to increase the productivity of shallot plants. The technology needed must be environmentally friendly according to biophysical and socio-economic conditions which can be measured by farming analysis (Haryati & Nurawan, 2009; Zahrottul *et al.* 2007). To be able to improve farmer technology, it is necessary to know the existing conditions of cultivation technology in shallot farming so that problems at the producer level, namely shallot-producing farmers can also be identified. If the cause is known, it will be overcome with the right solution. For this reason, an assessment of the existing conditions of cultivation and analysis of shallot farming by farmers is to facilitate the improvement of the required technology. The same has been done on citrus plants by Simatupang *et al.* (1998); Salak Sidimpuan by Daniel *et al.* (1998); Cocoa by Sahara *et al.* (2006); Salak by Jumakir and Julistia (2008).

This study aims to determine the existing conditions of shallot cultivation technology applied by farmers and the profit level of shallot farming so that in the future the results of this study can be used to improve cultivation technology to increase the productivity and income of shallot farmers in North Sumatra.

METHODOLOGY

The location of this study was carried out in Simalungun Regency, Dolok Silau District, Sarang Padang Village, from March to April 2016. The location determination was carried out *purposively* with the consideration that the area is a red onion production center in North Sumatra.

Primary data was collected through interviews with 100 respondents of onion farmers in

Simalungun Regency and continued by holding FGDs with farmers-producers, traders-collectors, community leaders, and local officials (PPL and village heads). The selection of respondents was also done intentionally (*purposive sampling*).

Analysis of observational data was carried out descriptively, both on aspects of cultivation, yield, marketing, and financial analysis of farming. To see the financial feasibility of each shallot marketer, a comparative analysis of revenues and costs (R/C ratio) and a comparative analysis of profits and costs (B/C ratio) were carried out, as follows (Kadariah 1988):

B/C Ratio = (total revenue - total expenditure): total expenditure

RESULT AND DISCUSSION

a. Characteristics of the Study Site

Sarang Padang Village, Dolok Silau District, Simalungun Regency is located at an altitude of 1,200 m above sea level. From Medan city to Simalungun district, it takes 5-6 hours to use public transportation. The distance from the sub-district to the village is approximately 2 km. Road access is good, but the majority of productive agricultural land areas are horticulture, local corn, oranges, and pineapples.

The land of the farming community of Sarang Padang Village is generally dry. There are dry lands in this village that used to be rainfed rice fields and village water line rice fields. Dryland former rice fields are generally planted with seasonal crops, while dry land is used as fruit gardens such as pineapple, coffee, or orange gardens. Average land ownership is 0.5 ha plus 0.2 ha of paddy fields. Dryland owned by farmers is generally flat (50%), terraced land/terraces (20%), and undulating (30%) with a slope of 5%.

The pattern of land ownership in this village is other than owning property, namely loans by paying rent. The dominant annual crops are corn, then cabbage, red chilies, and shallots. Shallots have been cultivated in this area for more than three generations.

The area of shallot farming carried out by the majority of farmers (90%) is 0.05 - 0.2 ha per farm household. Only 5% planted 0.01 ha and 5% planted 0.3 - 0.4 ha.

b. Characteristics of Shallot Farmers in Dolok Silau

To see the profile of shallot farmer households, data was collected on the farmer's age, education, number of family members, and the scale of the business (Table 1). Dewi (2009) stated that several aspects affect the skills of farmers in managing their farms, including age, education, status, and several family members.

Most of the farmers are in the age range of 25-50 years. This shows that onion farming is carried out at a productive age. This means that onion farming can be carried out optimally by devoting available physical labor. In terms of formal education, the highest number are high school graduates (47%). Age and level of education influence farmers in making decisions. Young age with a high level of education allows farmers to be more dynamic and more receptive to new innovations.

The number of dependents in the family is the number of people who are in household management other than the head of the household. This will affect the production and consumption patterns of farmers and result in differences in income received by farmer households. The average number of members

Table 1 Characteristics of shallot farmers in Sarang Padang Village, Dolok Silau, Simalungun

No	Description	Percentage of Number of Farmers (%)
1	**Farmer's Age**	
	25 - < 50 years	80
	50 - 55 years	15
	> 56 years	5
2	**Level of education**	
	SD (Primary School)	18
	SMP (Junior High School)	45
	SMA (Senior High School)	47
3	**Number of Family Dependents**	
	< 3 person	25
	3 – 6 person	50
	> 6 person	25
4	**Type of Work and Source of Income**	
	Farmer	95
	Non Farmer	5
5	**Number of Farmers by Land Ownership**	
	< 0,5 ha	93
	0,5 – 1 ha	0
	> 1 ha	7
6	**Origin of Labor**	
	From within the family	78
	From outside the family	22

Source: Processed Data, 2016

of a farming family is 3 - 6 people. The number of family members is a source of labor in the family in onion farming. 80 percent of the workforce comes from within the family. The use of external power is cultivating the soil with a tractor and helping weed weeds. Shallot farming is a business that requires a lot of labor, in plant care, especially weeding work. The more family members who are active in farming, the more likely they are to earn higher incomes than other farmers with inactive family members. In Dolok Silau District, the availability of labor for farming is relatively limited when compared to Karo District. This may be the reason that onion farming in this sub-district is not extensive, with an average of 0.05 - 0.1 ha and very rarely farmers plant up to 0.2 ha. The high scale of farming but not matched by the availability of sufficient labor will suppress the level of farm productivity (Musofie *et al.* 1993).

EXISTING CONDITION OF ONION CULTIVATION TECHNOLOGY FARMERS

Shallot Productivity in Dolok Silau

The unit used by Dolok Silau farmers to measure the productivity of shallots is based on a comparison of the weight of the seeds planted compared to the weight of the yield of the seeds, not using the standard unit, namely the weight of tubers per unit area.

Based on the results of processed data, the productivity of shallots in Dolok Silau District is still very low at 5.25 tons/ha. This productivity is as low as that obtained by farmers in Simanindo, Samosir, North Sumatra (Pardede *et al.* 2014). According to farmers, the low productivity of shallots occurs because the red onion plants often encounter “girl death”. The girl’s death in question is that the shallot plant dies before its age, so the onion bulbs produced are not

only small in size, but also have low productivity, and of course, causes the selling price to be cheap per kilogram. Factors that cause red onions to die are due to the attack of the shallot caterpillar *Spodopthera exigua* (Moekasan, Basuki, & Prabaningrum, 2012; Nurjani and Ramlan 2008) and *Fusarium* wilt disease, as well as leaf rickshaw due to *Alternaria porii* (Bakrie *et al.* 1999; Maskar *et al.* 1999; Nurmarwah and Limbongan 1999).

Source of Onion Seeds

Shallot farmers in Sarang Padang Village, Dolok Silau, Simalungun, use seed planting material in the form of bulbs for their shallot farming. The source of the seeds comes from Samosir, which is brought by traders and without warranty. The need for seeds per ha is only 500 - 625 kg/ha. The seeds used are small (3 - 4 g/tuber seed). Farmers do not know the name of the onion varieties planted. Shallots are distinguished only based on the purpose for which they are consumed, namely fried shallots (called fried onions) and non-fried (ordinary shallots). This article discusses ordinary red onions. In Dolok Silau District, about 10% of farmers cultivate red onions for frying (fried onions), and 90% of cultivating non-fried red onions or regular red onions.

Need for Seeds and Area of Shallot Farming at Farmer Level

The planted area is estimated based on the weight of the seeds planted. On average, farmers plant 20-50 kg of shallot seeds from tubers, for an area of 400 m2 or called 1 rante. This means that the need for seeds is only 500 - 625 kg per ha. The spacing used is irregular, namely 20 x 30, 23 x 30, or 25 x 30 cm in one stretch. In this location, the volume of seed requirement is low, which is only half of the seed requirement used by farmers on the island of Java, which reaches 1000 - 1200 kg/ha (Nurmalinda *et al.* 1994; Nana *et al.* 2003; Haryati & Nurawan, 2009). Farmers' understanding of onion seeds is a small tuber. This perception is wrong because what often happens in the field is that small tuber are produced from diseased plants so that growth is not optimal, and girls die. If such seeds are used as seeds for the next generation of crops, their productivity will be low.

Counseling on the use of quality seeds is very much needed for Dolok Silau farmers to change their perspectives on quality seeds.

Onion Planting Pattern

The onion cropping pattern in Dolok Silau is generally monoculture. The onion growing season is from late March to May. Planting is done only once a year, after harvesting upland rice, corn or other seasonal crops. Natural resources such as water for watering shallots are not available all year round in this place. In the dry or rainy season, people do not plant shallots, while in Samosir Regency, North Sumatra, the planting season is from September to November (Pardede *et al.* 2009).

Shallots in this location are harvested after 90-100 days after planting. The age of shallots is 35 days longer than in the lowlands such as Brebes, where harvesting is only 55-56 days (Rosyadi *et al.* 2010).

Soil Processing and Planting Shallots the Farmer Way

The land used for planting shallots is processed using a tractor twice until it is loose, then beds with a width of 3-3.5 m are made. The distance between the beds is a trench 0.4-0.5 m wide with a trench depth of 10-15 cm. This means

that land efficiency is around 86%. It is classified as very efficient. In the research study, the estimated land efficiency for onion cultivation is calculated at 70 percent.

The land used is not former shallots but former rice, corn, and cabbage crops. This location is very suitable for providing shallot seeds between fields because shallots are not continuously planted. In terms of environmental sanitation is classified as very good.

Before planting, it was seen that the workers were free to step on the beds walking as usual, even though the land would become dense. They haven't realized this yet, as if they don't keep the land open for shallots.

For onion planting, the work team usually consists of 5 people. One worker who made the planting hole walked first in front. To make planting holes, workers hold two tugals in their right and left hands, without a distance measuring device. The measuring device is only the footsteps so the spacing is irregular. Plant spacing besides affecting production per ha also determines the size of harvested tubers (Wiguna, Hidayat, & Azmi, 2013). The spacing produced in this way varies greatly, namely: 20 x 30, 23 x 30, or 25 x 30 cm. Then two workers behind him followed and gave chemical fertilizers which were placed in a small bucket. The fertilizer that is placed is covered with the feet of the fertilizer provider while stepping forward. Behind the workers who provide fertilizer followed by the onion seed planter. Shallots are brought out and placed on a plate. Seedlings are taken from the plate and placed one by one in the planting hole that has been given chemical fertilizer.

Tugal, namely wooden stick, is made of round wood with a diameter of about 4-5 cm, slightly larger than the main toe. The length of the tugal is 1.5 m, and the end of the tugal is made slightly pointed to make it easier to make a planting hole. The tugal holder walks upright while dropping the tugal stick to the ground quickly.

Plant growth is very diverse. After the plants grew in the same location, it was seen that there were shallot plants that were already 10 cm high, some were still 5 cm, some were 2 cm and some had not even grown. This can happen because the seed sources come from different harvest times and are then mixed together, so that the emergence of shoots is different.

Fertilizer

Manure is given 5-10 grams per plant. Giving is done after the plant grows, while the first wedding. Shallot seeds grow 2 weeks after planting.

The chemical fertilizers used by shallot farmers are imported fertilizers such as RY from the BASF brand, Kali Butir Patent, and Amorphous. Subsidized fertilizers such as urea, ZA, or SP 36 are very rarely used. Fertilizer is given three times, basic fertilizer, first supplementary fertilizer, and second supplementary fertilizer. The amount of inorganic fertilizer applied per hectare is 400 kg, and the cost is around Rp. 2,800,000 while the organic fertilizer at 3.5 tons/ha costs Rp. 1,750,000 with a yield of 5.5 tons/ha. The amount of fertilizer given is based on their finances and the fertilizer dealer's recommendation. Whereas the right amount of fertilizer greatly affects the production and size of shallot bulbs (Wiguna *et al.*, 2013).

Weed Weeding

Weeding is done manually, pulling the grass by hand. This work is done by women. The labor required is very large for weeding, 166 man-days per hectare, or 45% of the labor requirement. There is 3 times the shallot weed control time. If the weeds are removed too late, the shallots will also be uprooted because the shallot roots are relatively shallow (Rukmana 2005). An effort that can be done is to introduce the use of silver plastic mulch which is widely sold in production and production shops.

Pest and Disease Control

To control the shallot caterpillar (*Sphodopthera exigua*), farmers use liquid insecticides such as lanate and curacron. Meanwhile, to control disease, farmers use solid and liquid fungicides, namely Mankozeb (Antracol), Trineb, Daconil, and Pervicur N. Shallots are not only susceptible to pests/diseases of many types and numbers, but are also susceptible to climate and weather changes.

Pests that attack shallots are the shallot caterpillar, *Spodoptera exigua* (Shabbuddin and Mahfud 2010). Continuous and intensive use of insecticides can lead to resistance to these insecticides (Sudarwohadi and Tati 2001). The caterpillar control technology does not only use insecticides, but can also use exit pheromones (Haryati & Nurawan, 2009), using neem leaves or *Beauvera bassiana* (Shahabuddin & Mahfudz, 2010), and also using *SEMNPV* (Adiyoga *et al*. 2001). Wilt or moler disease is caused by the fungus *Fusarium* oxysporum (Edy et.al. 2007), purple spot, and late blight are caused by *Alternaria porri* and *Peronospora* (Agung 2010). Moler disease control can be done using Trichoderma, biological fungicides, or using *Pseudomonas fluorescence* (Pf) bacteria. Changes in weather such as hot rain (singular), are also the cause of damage to shallots, which are misinterpreted by farmers by spraying pesticides (insecticides and fungicides). Even though rinsing with water is enough. The technology has the opportunity to be developed in this location.

Harvest

Shallot harvest age ranges from 90-100 days. This happened because the dormant period of the seeds planted had not been completed so the plants began to grow after 2 weeks of being planted. Harvesting is done not simultaneously, which is selected when the plant has fallen, then harvested.

The onion harvest season in Sarang Padang Village takes place from the end of June to August. The harvest is very suitable as a source of seeds. The yield schedule is very suitable for planting in other locations on the island of Samosir which has a planting schedule in September - October. This method of seeding system is known as the inter-field seed line system (Jabal) in food crops (Hernowo et.al 2012).

Treatment After Harvest

There is no special treatment carried out by farmers on shallots after harvest. Shallots are sold in wet form, which means that the plant is pulled out, the leaves are withered for a few hours, and the leaves are cut, then sold. There is no hanging drying system as was done in the Haranggaol area (Simatupang 2010). Collectors in the village came to buy the wet shallots.

The Existing Condition of Shallot Marketing

The marketing of shallots is carried out in Dolok Silau District and is generally done by weighing and not by cutting. Road infrastructure is good. There are two kinds of marketing, namely traders come to farmers to the land if the amount of harvest is large, or farmers sell to the market in Seribu Dolok District. Pricing between farmers and traders is done by bargaining. Farmers will choose to sell to traders who offer higher prices, except for subscriptions. In the subscription relationship, there is mutual trust between farmers and traders. Merchants will provide prices prevailing in the market to farmers who subscribe to them. In Dolok Silau, the marketed shallots are still wet the day after harvest. Therefore, the selling price at the farmer level is cheaper than red onions from Haranggaol farmers, in the same district, namely Simalungun Regency, which are sold in dry conditions. Farmers sell shallots to collectors at the village level, then village traders sell to collectors at the sub-district/ district level and then sell them to wholesalers or retailers.

Identification and Solution of Shallot Farming Problems in Saran Padang Village, Dolok Silau

Identification and Solution of Shallot Farming Problems in Saran Padang Village, Dolok Silau can be seen in Table 2.

Farming Business Analysis

Shallot farming in Saran Padang Village, Dolok Silau District is characterized by a very intensive labor requirement from tillage to harvest/post-harvest, and a relatively large capital, almost Rp. 60 million per ha. The need for labor absorbs 36% of the total production cost of shallot farming in Dolok Silau. The total need for labor starting from land cultivation is about 365 working days (HOK) per ha. The results of Henny and Valeriana's (2008) research in Brebes show that the number of shallot workers per hectare is higher, namely 420 HOK. The highest demand is for weeding workers of 166 HOK (45%), followed by the need for pesticide spraying workers of 80 HOK (22%) and followed by harvesting labor of 42 people (12%), while land processing is 41 HOK (11%)).

The limitation of family labor in handling shallot farming is the reason that farmers are only able to grow shallots in an area of 0.05-0.1 ha. Therefore, energy reduction technology is needed in weeding weeds. Weeding time is a determinant of the success of onion farming. This is due to shallow shallot roots (Rukmana 1994). If weed control is done too late, it will cause the onion to be uprooted. This will interfere with plant physiology. Due to disturbing roots, production is not optimal. Efforts to reduce weeding power can be done by using silver plastic mulch. This effort is commonly done by farmers in red chili farming, but in red onions has never been done in the village. This means that mulch material is easily available in the village.

The success of the development of shallot cultivation is largely determined by the persistence of plant care carried out by farmers. This is because shallot plants are susceptible to pests such as Spdopthera exigua (Shabbuddin and Mahfud 2010), moler disease caused by *Fusarium oxysporum* (Edy *et al.* 2007), purple spot and late blight caused by *Alternaria porri* and *Peronosfora* (Agung). 2010).

Changes in weather such as hot rain (singgar), are also the cause of damage to shallots, which are overcome by farmers by spraying pesticides (insecticides and fungicides), so that labor to control plant-disturbing organisms also requires workers who are ranked 3rd largest.

In Dolok Silau Village, the total production cost of shallots is Rp. 59,598,000 with a B/C ratio of 0.59. The production capital of shallots per kg is Rp. 10,743.00. Shallot farming in Dolok Silau has a profit with a selling price of Rp. 18,000 per kg. The results of farming analysis in Palu get B/C=0.73 (Dewi 2009), in Brebes B/C 0.1 (Rosyadi, 2016), and in South Sulawesi B/C=0.94 (Thamrin *et al.* 2003). Based on the results of the analysis of onion farming in Brebes by Nurasa and Darwis (2008), obtained an R/C of 1.1 but according to the farmers, the profits

Table 2 Problems, sources of problems, root causes, and solutions to problems in developing shallot agribusiness in Sarang Padang Village

Problem	Source of Problem	Root of the problem	Problem Solution
Low farmer productivity (average 2,2 -4,2 t /ha) Yield potential: 10- 20 ton/ha according to the onion SOP	Cultural technology is not optimal	1. Limited skill knowledge 2. Limited stock availability (mainly, quality seeds are difficult to obtain, so onions consumed from the market are used as seeds) 3. Limited capital 4. the application of technological innovation is very less	Improved guidance through farmer group and field school approaches a. Improved group dynamics (management consolidation) b. The relationship between farmer group partnerships and production input providers Capital institutional innovation a. Improved coaching b. Introduction of technological innovation
Limited marketing	1. Uncertain quality, quantity and continuity	1. Limited harvest and post-harvest technology	Provision of drying warehouse
	2. The price is determined by the buyer and is very volatile	1. No partnership yet 2. Poktan doesn't work in marketing yet	Partnership facilitation
	3. The product is not in accordance with the wishes of the market	1. There is no linkage between the agribusiness sub-systems	Supporting institutional innovation and market information improvement

Source: Processed Data, 2016

Table 3 Analysis of farmer's shallot farming in Sarang Padang Village

Description	Score	% Capital
Seed kg (Rp)	21.000.000	35 %
Fertilizer		8 %
SS (Rp)	525.000	
PKB (Rp)	525.000	
Hydrokarate (Rp)	350.000	
RY (Rp)	350.000	
Organic fertilizer (Rp)	2.750.000	
Pesticide		16 %
Liquid (Rp)	5.280.000	
Solid (Rp)	4.128.000	
Labor		36 %
Family (Rp)	19.380.000	
Outside the family (LK) (Rp)	1.860.000	
Farm Lease, Equipment Depreciation, Tax	3.450.000	6%
Total production cost (Rp)	59.598.000	
Onion production capital (Rp/kg)	10.743	
Production		
a. Amount (kg)	5.250	
b. Price (that often happens) Rp/kg	18.000	
Acceptance (Rp)	94.500.000	
Income (Rp)	34.902.000	
R/C	1,59	
B/C	0,59	

obtained are not sufficient to meet the economic needs of the farmer's household.

The income of shallot farmers is largely determined by the selling price of shallots and production at harvest. The average price of wet shallots sold in Sarang Padang Village is Rp. 18,000.00, while the price of dry shallots is Rp. 28,000.00 per kg. It is still possible to increase production to above 15 t/ha (Thamrin *et al.* 2003). Technological improvements can be made in the form of the use of quality shallot seeds, the use of fertilizers according to the plant's needs, close spacing, the use of environmentally friendly pesticides for pest and disease control, and energy-saving weed control using mulch.

Institutional

Information on shallot cultivation technology was obtained by some farmers from extension workers (50%), and production and production traders. The technology that has been obtained is the use of *Trichoderma* to control *Fusarium* wilt. However, this is still difficult to implement because the materials are not available at the location. Some farmers get technology from their own experience in the field.

Onion prices fluctuate. The difference in the selling price of shallots can occur within a week, even within a few days. Since the farmers do not have warehouses, they cannot resist delaying the selling time to see better price opportunities. Shallots are a relatively durable commodity. This commodity can be stored for up to 2 months, although the risk is volume reduction due to weight loss. Farmers already know this, but because of limited farming capital, they tend to sell on the day they harvest.

The financial institution at the village level is the Union Credit (CU) from the church associations of each farmer (50%). The amount of the loan is still under ten million. About 3% of farmers have borrowed money from banks in the sub-district for their farming (not only for shallots). As many as 47% of farmers never borrow money from financial institutions but only from families, without interest. Institutional production facilities, and traders processing agricultural products do not yet exist in these villages and sub-districts.

CONCLUSIONS AND RECOMMENDATIONS

From the results of the study, several conclusions can be drawn as follows :

The productivity of shallots in Dolok Silau District is still relatively low at 5.25 tons/ hectare, this happens because the onion cultivation technology applied by farmers is not optimal, the use of quality seeds is also very limited, the limited agricultural production facilities available, not a good harvest and post-harvest process is carried out, where the harvest is sold still in a wet state and pest and disease control still relies on the use of chemical pesticides. By the characteristics of shallot farmers in Saran Padang Village, Dolok Silau Sub-district are relatively good, where the age of farmers is dominated by productive age with ages between 25 and 50 years as much as 80%, and junior high school education levels as much as 45% and high school as much as 47%, get the results of the shallot farming analysis in Saran Padang Village, Dolok Silau District an R/C ratio of 1.59 and a B/C ratio of 0.59. With a B/C level of 0.59, at a selling price of Rp. 18,000 per

kg, farmers still earn a profit of Rp. 34,902,000 per ha. And opportunities to improve cultivation can be done by increasing planting density, improving seed quality, reducing weeding power, and integrating pest and disease control. To anticipate price fluctuations, farmers need a simple storage technology for shallots, in the form of group warehouses, which can delay the sale of shallots when prices fall.

REFERENCES

Adiyoga Witono,. Anna L.; Thomas A.S. dan Achmad. H. 2001. *Persepsi Petani terhadap Status dan Prospek Penggunaan Se MNPV pada Usahatani bawang merah*. J. Hort 11 (1): 58-70.

Agung, Anak Gede Putra. 2010. *Pengaruh Jarak Tanam dan Dosis Pupuk Kandang terhadap Pertumbuhan dan Hasil Bawang Merah* (*Allium ascalonicum* L.) di Lahan Kering Beriklim Basah. Ganec C. Swara 4 (1): 22-29.

Ali Erwin, Celcius T., Paulus A.P. dan Ribka M. Kumaat. 2015. *Efisiensi Pemasaran Bawang Merah Tonsewer Kecamatan Tompaso Barat Kabupaten Minahasa*. ASE 11(2A): 21-32.

Bakhrie, Chatijah dan A. Arjunhar. 1999. *Pengaruh penggunaan Varietas Dalam Paket Teknologi terhadap Pendapatan usahatani Bawang merah. Pros Semnas Hasil Pengkajian dan Penelitian Teknologi Pertanian Menghadapi Era Otonomi Daerah 3-4 Nopember di Palu*. PSE Bogor.

BPS 2016. *Sumatera Utara Dalam Angka*.

Daniel, M., Besman Napitupulu, A.J. Harahap, NielDalina dan D. Harahap. 1998. *Keragaan Teknologi Usahatani dan Prospek Ekonomi Salak Sidimpuan*. Pros Semnas Ekspose Hasil Penelitian dan Pengkajian Teknologi Pertanian di Sumatera Utara. Editor Ng. Ginting et.al.. PSE Badan Litbang Pertanian, 643-656.

Dewi Nur Asih. 2009. *Analisis Karakteristik dan Tingkat pendapatan Usahatani bawang merah di Sulawesi Selatan*. J. Agroland 16(1): 53-59

Edi Suprapto Santoso, Loekas Soesanto dan Toto Agung Dwi Haryanto. 2007. *Penekanan Hayati Penyakit Moler Pada Bawang Merah Dengan Trichoderma harzanum, T. Conigii dan Pseudomonas fluorescence p* 60. J. HPT Tropika 7 (1): 53-61.

Haryati Y.dan Agus Nurawan. 2009. *Pengkajian usahatani Bawang Merah di Cirebon*. JPPT 12(3): 201-209.

Hernowo, Didik, Evawati, Timbul M., Akmal, dan Sortha Simatupang.2012. *Kebutuhan dan Ketersediaan Benih Kedelai Serta Sistem Perbenihannya di Sumatra Utara*. Pros semnas BBP2TP: 1597-1602.

Henny Mayrowani dan Valeriana Darwis. 2008. *Perspektif Pemasaran Bawang merah di Kabupaten Brebes, Jawa Tengah*. Pros. Semnas PSE:170 -186.

Jumakir dan Julistia Bobihoe. 2008. *Keragaan dan Analisis Usahatani Salak (Salacca Edulis) di Lahan Pekarangan Desa Sri Agung (Studi Kasus Desa Prima Tani Kabupaten Tanjung Jabung Barat, Jambi)*. Jurnal Pengkajian dan Pengembangan Teknologi Pertanian. 11.(2),: 104-113.

Kadariah. 1988. *Evaluasi Proyek Analisa Ekonomi*. LPEE-UI: Jakarta.

Maskar , Sumarni, A. Kadir, dan Chatidjah . 1999. *Pengaruh Ukuran Bibit dan Jarak Tanam Terhadap Hasil Panen Bawang Merah Varietas Lokal Palu. Pros Semnas Hasil Pengkajian dan Penelitian Teknologi Pertanian Menghadapi Era Otonomi Daerah 3-4 Nopember di Palu*. PSE Bogor.

Moekasan, K.t. dan R. S. Basuki. 2007. *Status Resistensi Sphodoptera exigua Hubn pada Tanaman Bawang Merah Asal Kabupaten Cirebon Asal Brebes dan Tegal Terhadap Insektisida Yang Umum Digunakan Petani di Daerah Tersebu*t. J. Hort 17 (4): 21-24.

Musofie A.D. Pamungkas, D.E. Ahyono dan A,. Rasyid. 1993. *Pengaruh Faktor Sosial dan Faktoe Ekonomi Terhadap penerapan Perilaku Panca Usaha Peternakan pada Kelompok ternak Sapi Perah*. J. Ilmiah Penelitian Ternak Grati. 3(2): 83- 90.

Nana Sutrisna, Iskandar Ishaq dan S. Sualan. 2003. *Kajian Rakitan Teknologi Budidaya Bawang Daun (Allium fistolosum N) Pada Lahan Dataran Tinggi Bandung Jawa Barat*. JPPT 6 (1): 64-72.

Nurasa Tjetjep dan Darwis V. 2008. *Analisis Usahatani dan Keragaan Margin Pemasaran Bawang Merah di Kabupaten Brebes*. J. Acta Agrosia 10 (1): 40-48.

Nurjanani dan Ramlan. 2008. *Pengendalian hama Sphodopterea exigua Hubn Untuk Meningkatkan Produktivitas Bawang Merah Pada Lahan Sawah Tadah Hujan di Joneponto Sulawesi Selatan*. JPPT 1(2) : 163- 169.

Nurmarwah dan J. Limbongan. 1999, *Potensi pengembangan Bawang Merah lokal (Allium ascalonicum) di lembah palu*. Pros Semnas hasil pengkajian dan penelitian Teknologi Pertanian menghadapi Era Otonomi Daerah 3-4 Nopember di Palu. PSE Bogor.

Pardede Hedidiana, Thomson Sebayang dan lili Fauzia. 2014. *Analisis Usahatani Bawang merah. Studi Kasus: Desa Cinta Dame Kecamatan Simanindo, Kabupaten Samosir*. J on Economic of Agriculture and Agribusiness 3(7): 1-12.

Rosyadi Imron, Nur Achmad dan Triyono. 2010. *Meningkatkan Efisisensi dan Profitabilitas pada usahatani Bawang Merah di Kabupaten Brebes*. Warta Fakultas Ekonomi Univ Muhamadiyah Surakarta 13 (1): 61-65.

Shahabuddin dan Mahfudz. 2010. *Pengaruh Aplikasi Berbagai Jenis Insektisida terhadap Ulat Bawang (Spdopthera exigua Hubn) dan Produksi Bawang Merah Varietas Bima dan Tinombo*. J. Agroland 17(2): 115-122.

Sahara D., Z. Abidin dan Amiruddin Syam. 2006. *Profil Usahatani dan Analisis Produksi Kakao*. Jurnal Pengkajian dan Pengembangan Teknologi Pertanian. 9:161-164.

Sartono dan Suwandi, 1996. *Bawang Merah di Indonesia*. Monograf No 5: Balai Penelitian Sayuran.

Sortha Simatupang, B. Napitupulu, E. Sembiring, A. Simanjuntak, B. Karo dan R. Sitepu. 1998. *Karakterisasi Keragaan Teknologi Petani Jeruk Siam Berastagi Karo*. Pros Semnas Ekspose Hasil Penelitian dan Pengkajian

Teknologi Pertanian di Sumatera Utara. Editor Ng. Ginting et.al.. PSE Badan Litbang Pertanian, 733-749.

Simatupang, Sortha. 2010. *Keragaan Teknologi Budidaya dan Analisa Usaha Tani Bawang Merah di Lokasi Petani Pelaksana Program Pemberdayaan Petani Melalui Teknologi Informasi dan Pertanian (P3TIP) Karo Sumatera Utara*. Pros Seminar Nasional BBP2TP9-11 Des 2010: 567-575.

Sudarwohadi S. dan Tati, Rahiati. 2001. *Pengaruh Aplikasi Insektisida Klorpirifos dan Delthametherin Pada Tanaman Bawang Merah Terhadap Reurgensi Spdopthera Exigua Hbn (Lepidothera Noctuidae)*. J. Hort. 11(3): 170-177.

Titik Purbiati. 2012. *Potensi Pengembangan Bawang Merah di Lahan Gambut*. J. Litbang Pertanian 31(3): 113-118.

Winarto, Loso, M. Prama Yufdi dan L. Haloho. 2009. *Kajian Paket Teknologi Bawang Merah di Haranggaol*. 2009. JPPT12(1): 1-10.

Yati, Haryati. dan Agus Nurawan. 2009a. *Peluang Pengembangan Feromon Seks dalam Pengendalian Hama Ulat Bawang (Sphosopthera exigua) Pada Bawang Merah*. J. Litbang Pertanian 28 (2): 72-77.

Yati Haryati dan Agus Nurawan.2009b. *Pengkajian Usahatani Bawang Merah di Kabupaten Cirebon*. J PPT 12(3): 201-209.

Zahrottul Hikmah, Rismarini Z. dan Rima P. 2007. *Kontribusi Pemeliharaan Tanaman Buah Kuini terhadap Pendapatan Usahatani di Lahan Pasang Surut, Kalimantan Selatan. Pros. Seminar HasilPenelitian dan Pengkajian. di Palembang Tanggal 26-27 Juli 2006*. Ed: Mustika Edi Armanto et.al. 2007. BP2TP.: 504-510.

Thamrin, M., Ramlan, Armiati, Ruchjaningsih dan Wahdania.2003 *Pengkajian Sistem Usahatani Bawang Merah di Sulawesi Selatan*. JPPT 6(2): 141-153.

Tofik Hidayat, M. Fajar Nurwildan. 2013. *Pembuatan Mesin Siram Portabel Untuk Mengurangi Tingkat Keluhan musculoskletal Pekerja Siram Tanaman Bawang Merah di Kabupaten Brebes*. Pros. Seminar Rekayasa Teknologi Industri dan Informasi: 172-175.

Thomas Agoes Soetiarso, Wijaya W. H. Atie Sri Duriat Anggoro Hadi P. R.M. Sinaga dan A. Hidayat. 1994. *Survai Idenfikasi Masalah Putih di datarn Medium*. Buletin Penel Hort. 27(1): 74-89.

Wiguna G. Hidayat, IM dan Azmi C. *Perbaikan Teknologi Produksi Benih Bawang Merah Melalui Pengaturan Pemupukan, Densitas dan Varietas*. J. Hort 23(2): 137-142.

Yati, Haryati. dan Agus Nurawan. 2009a. *Peluang Pengembangan Feromon Seks Dalam Pengendalian Hama Ulat Bawang (Sphosopthera exigua) Pada Bawang Merah*. J. Litbang pertanian 28 (2): 72-77.

Yati Haryati dan Agus Nurawan.2009b. *Pengkajian Usahatani Bawang Merah di Kabupaten Cirebon*. J Hort. 12(3) : 201-209.

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